

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/017918

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl.⁷ C03B37/012

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl.⁷ C03B37/012

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 61-295253 A (Mitsubishi Cable Industries, Ltd.),	1-3, 7-15, 17;
Y	26 December, 1986 (26.12.86), Full text; drawings (Family: none)	19 4-6, 16, 18
Y	JP 2000-143270 A (Shin-Etsu Chemical Co., Ltd.), 23 May, 2000 (23.05.00), Par. No. [0007] & EP 0999189 A1	4-6, 16
Y	JP 02-275723 A (Shin-Etsu Chemical Co., Ltd.), 09 November, 1990 (09.11.90), Claims (Family: none)	6, 18

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
03 February, 2005 (03.02.05)Date of mailing of the international search report
22 February, 2005 (22.02.05)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

2. Citations and Explanation

Citation 1: JP-A-S61-295253 (Mitsubishi Cable Industries, Ltd.)

December 26, 1986

Citation 2: JP-A-2000-143270 (Shin-Etsu Chemical Co., Ltd.)

May 23, 2000

Citation 3: JP-A-H02-275723 (Shin-Etsu Chemical Co., Ltd.)

November 9, 1990

Claims: 1-3, 7-15, 17 and 19

Lack of Inventive Step

Regarding the inventions related to claims 1 and 10, Citation 1 describes a method for stretching an optical fiber base material by controlling the moving speed $V_b(x)$ of the heating apparatus relative to the optical fiber base material, based on the difference between the outer diameter $D(x)$ of the optical fiber base material at a position to be heated and a reference value of the outer diameter, and an apparatus for stretching the same. Citation 1 also describes that, using this method, the pre-stretched optical fiber base material having uneven outer diameters is steadily imparted with a constant amount of heat per unit volume to maintain the softening temperature at a constant level at the portion to be stretched, so that the outer diameters of the post-stretched optical fiber base material are uniformed (refer, in particular, to the scope of the claims, the embodiments and the drawings). Accordingly, in view of the invention described in Citation 1, it would have been obvious for a person skilled in the art to control the moving speed so as to fall in the vicinity of a value which is in proportion to a square value of the ratio between the outer diameter of the position to be heated and the reference value of the outer diameter, so that the optical fiber base material is imparted with the constant amount of heat per unit volume. In this method, it would also have been obvious for a person skilled in the art to choose the maximum outer diameter of the optical fiber base material as a reference value of the outer diameter.

Regarding the inventions related to claims 2, 11 and 12, Citation 1 describes that the outer diameter of the pre-stretched optical fiber base material is measured to control the $V_b(x)$ based on the results of the measurement.

Regarding the inventions related to claims 3 and 13, it is a common practice to set a target stretched outer diameter at a desired value in a method of stretching an optical fiber base material. Further, it is also a common practice to control the drawing speed of the optical fiber base material to perform stretching based on such a set value, which is merely an approach commonly used in the art.

Regarding the inventions related to claims 7-9, 14 and 19, the invention described in Citation 1 provides a method for stretching an optical fiber base

material, in which one of the gripping devices is fixed while the heating apparatus is moved. The invention of Citation 1 is to control the outer diameters of an optical fiber base material to be even by controlling the moving speed of the heating apparatus and the drawing speed of the gripping device relative to the optical fiber base material. In order to achieve such a relative speed, it would have been obvious for a person skilled in the art to use a method in which both of the gripping devices are moved, and a method in which both of the gripping devices and the heating apparatus are moved.

Regarding the inventions related to claims 15 and 17, the invention described in Citation 1 uses an oxyhydrogen burner as the heating apparatus.

Claims: 4-6, 16 and 18

Lack of Inventive Step

Regarding the inventions related to claims 4-6 and 16, it is known that, in stretching an optical fiber base material with the heating apparatus being moved, the position from where the outer diameter begins to change is different from a position to be heated (refer to par. [0007] of Citation 2). The changing position depends, for example, on the diameter of the optical fiber base material, the moving speed of the heating apparatus, and the performances of the heating apparatus. Therefore, no particular difficulty is recognized as being present in defining the changing position at a position 0-50 mm distanced from the position to be heated.

Regarding the inventions related to claims 6 and 18, using an electric furnace as the heating apparatus is a known matter (refer to Citation 3, if necessary).